

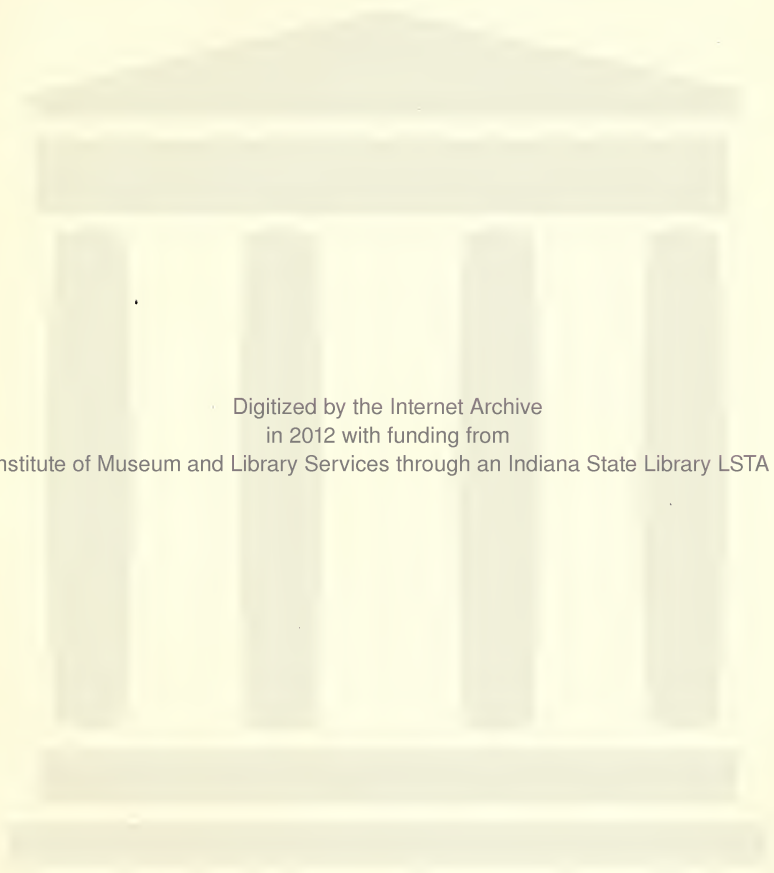
CYRUS HALL McCORMICK
AND THE REAPER

By REUBEN GOLD THWAITES

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Cyrus Hall McCormick

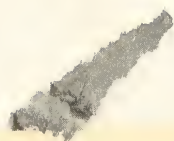




Cyrus Hall McCormick

1809-1909

Commemorating the centenary of the birth of Cyrus
Hall McCormick, Inventor of the Reaper



Cyrus Hall McCormick and the Reaper

By Reuben Gold Thwaites

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Cyrus Hall McCormick and the Reaper

The Scotch-Irish

In all great economic movements, some man stands pre-eminent as the prophet and the pioneer. Cyrus Hall McCormick, a Scotch-Irishman, ranks in history as the leader who showed how peacefully to conquer the vast prairies of the American West, to uplift its farming class, and by cheapening the bread of the toiling millions to open to them the possibilities of a higher life.

America owes much to his sturdy race, which claims a goodly share of the men who won and developed the trans-Alleghany. Their ancestors had been taken from Scotland to subdue Catholic Ulster; but in time these people had themselves become the victims of civil and ecclesiastical oppression in Ireland, and emigration to North America seemed their only relief from domestic afflictions. Landing on our sea-coast, by scores of thousands, all the way from Pennsylvania to the Carolinas and Georgia—a few in the seventeenth, but the majority of them during the first half of the eighteenth century—they at once sought new and cheap lands; finding these upon the frontier, which was not then far from tide-water. Gradually, as the pressure on available land became greater, the younger generations of Pennsylvania Scotch-Irish moved from their restricted wheat fields southwestward through the troughs of the Alleghanies, either tarrying on the upper waters of the Potomac or pressing on to the deep and fertile valleys of southwest Virginia and North Carolina. On their part, the South Carolina and Georgia Scotch-Irish spread northward and northwestward; and in due course both streams

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of these Ulster bordermen, now developed into expert Indian fighters, united in that forcing of the mountain passes and reaching out for fresh lands on westflowing waters, which was so conspicuous a feature of American history just previous to and during the Revolutionary War.

Robert McCormick

The McCormicks were among the earliest Scotch-Irish to settle in Pennsylvania. In time a younger branch followed the well-trodden path to the Valley of Virginia, in the heart of which—on Walnut Grove Farm, in Rockbridge County—Robert McCormick was born on June 4, 1780, the son of a successful farmer. Robert devoted a large share of his attention to the mechanical side of farm life, and early became an adept in the working of wood and iron. When he himself came into possession of the paternal acres, and acquired a family, he purchased for his sons three adjoining farms, the entire estate aggregating 1,800 acres. On three of these four farms he successfully operated sawmills, and on two of them flour-mills—his sturdy character, unusual enterprise, and business acumen winning for him deserved prominence throughout the valley as a substantial man of affairs.

Robert McCormick was more than this. Although, like his fellows, slightly schooled, he had developed a fondness for astronomy and other sciences, was given to historical reading, and proved to be an inventor of no mean capacity. In his farm workshops he fashioned an ingenious hemp-brake and cleaner, to be operated by horse-power, and it was successfully used by several of the valley folk, as well as by many in the great hemp-growing state of Kentucky. A clover sheller, a blacksmith's bellows, a hydraulic machine, a threshing machine, and a hillside plow were also among his contributions to rural mechanics.

As early as 1809 he began to devote much time in efforts to devise a reaping machine, and appears to have spasmodically worked upon his plan through upwards of a score of years—1816 being generally ascribed as the year in which the attention of his neighbors first became attracted to the enterprise. Various cutting mechanisms were tried by Robert McCormick. One of these is reported as having been “a system of rotary saws

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about 8 or 10 inches in diameter, which revolved, shear fashion, past the edge of a stationary knife; the saws were driven by bands from a cylinder which was turned by the revolution of the main wheel;" another "consisted of stationary curved sickles, against which the grain was forced and cut by vertical reels, with pins in their peripheries." But none of these schemes was found to be practical, and after a final discouraging test in the early harvest of 1831 he concluded to abandon the project as an unsuccessful experiment.

A Young Inventor

Cyrus Hall McCormick, Robert's eldest son in a family of eight children, was born at Walnut Grove February 15, 1809, the very year to which is commonly assigned the latter's first attempt at a mechanical reaper. The boy was carefully reared to be a practical farmer; but it was evident that in his case, as in his father's, the carpenter and blacksmith shops were more attractive to him than the open fields. He had clearly inherited his parent's inventive qualities, and was destined far to surpass him—indeed, to become one of the greatest figures in the industrial history of the world.

When but fifteen years of age this ingenious Scotch-Irish lad made a distinct improvement in the grain cradle. In the same year he, like his father, invented a hillside plow; a few seasons later supplanting it with a self-sharpening, horizontal plow, claimed to be the first of this character to be introduced.

The First Successful Reaper

But Cyrus McCormick's greatest contribution to agricultural economics was yet to come. The father's reaping machine, standing outside the blacksmith shop, on the home farm, had from the year of his birth been to him a familiar and alluring spectacle. His imagination was early fired with a desire to conquer the great practical difficulties of mechanical reaping. When the father finally acknowledged himself defeated, Cyrus took up the problem on his own account. Later in that same summer of 1831, when but twenty-two years of age, young McCormick constructed a machine essentially unlike any mechanism pro-

Cyrus Hall McCormick

posed by his father or any others who had before undertaken the task. He immediately demonstrated by practical tests, that the successful type had thus been created; and he never departed from that type, in conformity wherewith all success in this art has since proceeded.

Significance of the Event

The immense significance of this event may be realized when we remember that since man began to practise the arts of agriculture, the grain harvest has been one of his chiefest concerns. There is nearly always abundant time in which to plant and to cultivate; but from its having to be cut when in a certain stage of ripeness, at the risk of losing the crop, the harvesting of grain is confined to a few days—generally not to exceed ten. The amount of grain, therefore, which a husbandman may successfully raise, obviously is dependent on the quantity which he may garner with the means available during this brief season. Throughout the long centuries in which the primitive sickle was the only harvesting implement, it was possible for a man to cut half an acre per day; thus production was limited to about five acres for each harvester—enough for the immediate needs of the people of the district, but insufficient for considerable export to distant non-agricultural communities.

Sickle and Cradle-Scythe

The long-handled scythe, which came in with the later centuries, was more expeditious than the sickle, which latter necessitated the retention of the grain in armfuls before laying it on the ground for the binder. But while the scythe was admirably adapted to mowing grass, in grain it had the disadvantage of leaving the stalks in a tangled mass—whereas, for further handling, they should be kept parallel. The sickle, therefore, remained as the chief instrument of the harvester until the invention of the cradle—a scythe equipped with fingers designed to retain the several stalks parallel until, by the sweep of the instrument, they were delivered in an even swath. The cradle-scythe, which was probably a gradual evolution, appears to have been in common use in the United States before the opening of the nine-

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teenth century, and is still employed in those parts of Europe and America where the reaping machine is not practicable. Indeed, in primitive lands, or on rough fields where even the cradle is not possible, the sickle still holds its own.

Early Mechanical Devices

The rigid limitation imposed by the use of the sickle, upon the supply of the most important food for man, had attracted the attention even of the ancients, and there appear to have been at least a few inventive minds among them, bent on overcoming it. The elder Pliny describes a device used by the Gauls during the first century of the Christian era—a cart pushed by an ox through the grain fields, bearing a frontal comb by means of which, it was said, the heads of grain were torn off and fell into the cart behind. But the waste by so clumsy a “heading” machine must have been considerable, and it contained not one essential element of the mechanical reaper of today. This Gallic contrivance must have long been retained, for we find a casual mention of it as late as 1577, with the assertion that it was “Woont to be used in France.” But there is no evidence that it was ever really used to any great extent; during the long stretch of centuries leading up to the introduction of the cradlescythe, the harvester was still chiefly dependent on the primitive sickle.

Nothing further is heard of machines for reaping, until about the middle of the eighteenth century—the first modern invention of this character being by one Derffer, a German, in 1755. Thenceforth, several ingenious men on both sides of the Atlantic were engaged upon the perplexing problem; so that previous to 1831 we have more or less veracious records of perhaps twenty-five German, French, American, and English designs, worthy of mention, to say nothing of a few unimportant attempts. Few of these various schemes were, however, more than mere suggestions. Some have come down to us merely in vague drawings and descriptions, that often betray in their authors a curious deficiency in mechanical knowledge; several were patented; and for a few there are evidences that field trials were actually undertaken. Those most discussed have been the plans ascribed to Henry Ogle, a schoolmaster in the English town of Remington,

Cyrus Hall McCormick

in 1825, and that invented the following year by the Rev. Patrick Bell, of Carmyllie, in the maritime county of Forfarshire, Scotland. Practically all of them depended for their cutting mechanism on blades revolving in horizontal planes, on shears rocking upon pivots, or on other impracticable means. Insurmountable difficulties in each of these devices compelled their permanent abandonment; each was upon a plan inherently incompatible with success, and no subsequent ingenuity has ever succeeded in obtaining from them any practical outcome.

The Correct Principle Established

The grain supply of the world was, therefore, still being gathered by hand, with no better implements than the sickle and the cradle, when, in the harvest of 1831, young Cyrus Hall McCormick entered a field of rye on Walnut Grove Farm, and demonstrated to his delighted father that he had at last established the correct principle of cutting. His experimental mechanism was of the rudest sort; but finding that the plan was satisfactory—to use his own words: “I had my machine more completely made, with the addition of a gathering reel, and with a better arranged divider, ready for trial in a neighboring field of late oats, during the same harvest, in which I then cut very successfully six or seven acres of crop.”

It is recorded that Robert McCormick, in conversation with a neighbor, William T. Rush, declared: “The reaper is a success, and I believe that I could not have made it so; but it makes me feel proud to have a son to do what I could not.”

The Requirements of a Reaper

It will be helpful to consider some of the conflicting requirements of a mechanical reaper, that must needs be overcome by would-be inventors before the machine could be effective in the field. It must be capable of dealing with grain under the great variety of conditions commonly encountered in practical operations; of so separating, cutting, and depositing the flexible and illusive stalks as to avoid any material shelling of the kernels, prevent entanglement, and insure their being delivered and retained in such parallelism as to be properly handled for curing,

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preserving, and threshing; of cutting it substantially parallel with the surface of the ground, however irregular that surface; and of securing sufficient power without conflicting impulses or undue weight.

It would not suffice to advance a plane cutting edge against the grain, or to use revolving blades or automatic shears—these had been abundantly tried by prior inventors, and all had met with irretrievable failure. The matter of developing and applying the requisite power was also of primary importance; this could only be obtained from the rotation of wheels under traction, and the amount was limited to the draft power of the team. The machine must therefore be reduced to a minimum of weight, lest it be too cumbersome to be propelled and guided over rough surfaces. The most economical method of applying draught is on the central line of resistance; yet in this machine, where economy in draught and equalization of strains are so essential, the team cannot travel directly in front of the cutting apparatus without trampling and shelling the grain. Most of the early inventors had arranged to place the team in the rear, thus making a push machine. The drawing for McCormick's first patent illustrated alternative methods—but from his earliest practise he adopted the side draft, and this is now almost universally used. The machine must be operated by men who are not mechanics, and generally they are at a distance from machine shops; in case the reaper breaks down, it usually is impracticable to seek technical aid, since protracted delay may mean the loss of a considerable share of the season's harvest. Illustrations of the conflicting conditions which it was necessary to reconcile, might be multiplied almost indefinitely. Until a plan consistent with all these exactions was devised, there could be no practical outcome.

Four Vital Elements

The experience of the past seventy-seven years has now clearly demonstrated that there are four vital elements in a reaper, none of which can even today be dispensed with; and yet all four were successfully embodied in the machine which Cyrus H. McCormick introduced to the world in the harvest of 1831:

I. A platform, or grain deck, one end of which is flexibly affixed to the master-wheel, while the other is supported by a

Cyrus Hall McCormick

small "grain" wheel, so that the platform may readily accommodate itself to the irregularities of the surface.

II. A reciprocating knife (operated directly from the master-wheel) having a serrated edge, with stationary teeth or guards projecting forward from the platform, immediately over the inner edge of the knife and bent backward beneath it—so that, as the knife reciprocates through them, the stalks will be sustained by the fixed teeth and sheared off.

III. A horizontal and adjustable reel, so situated as to rotate in the direction of the master-wheel, serving to sweep the standing grain towards the cutting apparatus, and delivering the several stalks parallel upon the platform, in a swath adapted to be raked off into bundles, ready for the binders.

IV. A divider, serving, as McCormick stated in his original description, to "divide and keep separate the grain to be cut from that to be left standing"—an operation in which the reel also takes part.

It is not conceivable that all four of these cardinal principles were in their entirety evolved from McCormick's inner consciousness. Every inventor of a machine has necessarily, consciously or unconsciously, utilized in his construction some mechanical elements that were formerly used. Some of McCormick's predecessors in this field undoubtedly employed platform, reciprocating blade, teeth, and reel. But invention consists in conceiving some new method of organizing elements so as to bring them into successful co-operation, and for the first time to achieve a useful result.

A Radical Departure

In after years McCormick stated that, living in the then isolated Valley of Virginia, he had never seen or heard of any experiments in the mechanical reaping of grain save those made by his father. Such experiments were at the time not infrequently alluded to in English agricultural magazines, but none of these publications had as yet penetrated to Walnut Grove. Without doubt there was in this isolation a certain advantage, for the young inventor was free to approach the subject from a comparatively fresh and original point of view. Probably this was the reason why, contemplating only the failures of his father, he made a radical and most essential departure from all his predecessors,

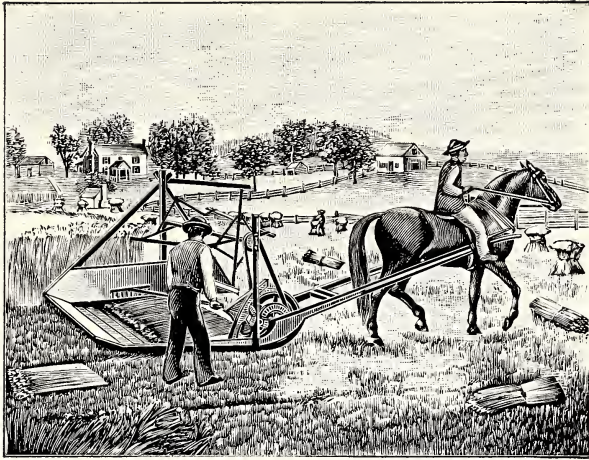
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inventing a machine along entirely new lines. As is usually the case with the first form of an invention, the McCormick reaper of 1831 was crude in construction; but there is nothing on record indicating that any prior invention embodied such a scheme of construction, or indeed any scheme that succeeded or survived; and despite all subsequent invention, and it has been lavish, no one has contrived a successful substitute for McCormick's original plan. From it has proceeded in unbroken succession, and with remarkable adherence to the primary arrangement—although subsequently enriched with many refinements in details and supplemental improvements—the reaper that has taken and still holds possession of the markets of the world.

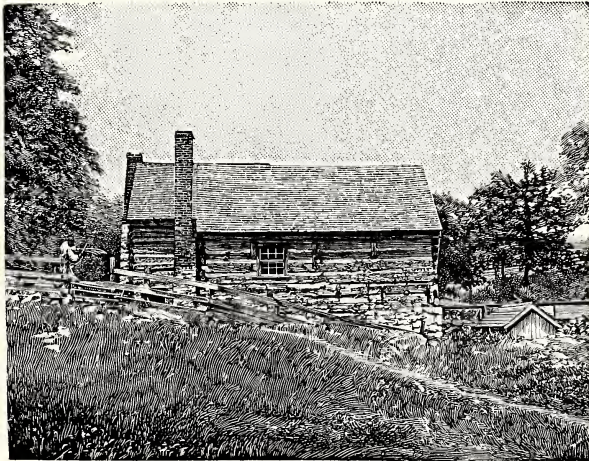
Early Tests of the Invention

Although having mastered the essential principles of a reaper, McCormick did not, like many inventors, immediately seek a patent. Papers are often granted to inchoate schemes that have afterwards to be worked over in their mechanical construction, and involve subsequent invention before they are practicable. McCormick subjected his machine to repeated tests during three successive harvest seasons, under a variety of conditions and with different grain, and took out his patent (June 21, 1834) only after having fully vindicated and exhibited its practical value.

In its issue for September 28, 1833, *The Union*, a small weekly newspaper published at the neighboring county town of Lexington, contained the first detailed description of the machine to appear in print; this being followed in the same issue by the certificates of Archibald Walker, James McDowell (afterwards governor of Virginia), John Weir, and William Moore, neighbors of the McCormicks, to the effect that they had witnessed the reaper in successful operation, cutting about twelve acres per day in badly-lodged wheat. Mr. Weir testified to having also seen the machine doing good work in the harvest of 1832. *The Mechanics' Magazine*, of Baltimore, in November, 1833, gave a more detailed account by its editor, who had seen "our ingenious and respectable countryman, Mr. Cyrus H. McCormick," operate the machine "during the late harvest," in the presence of "a large crowd of citizens" to whom it "gave general satisfaction."



The original McCormick reaper
As invented in 1831



Blacksmith shop, Walnut Grove
Wherein was made the first McCormick reaper

Cyrus Hall McCormick

Although possessed of his patent, Mr. McCormick was even then not prepared to sell his reaper to the public. He would not, as was afterwards related by himself, "attempt sales either of Machines or rights to manufacture, until satisfied that the Reaper would succeed well * * * in the great variety of situations in which it was necessary to operate."

Manufacturing the Machine

Thus season by season, from 1834 to 1839, the inventor patiently carried on his trials, personally manufacturing his several experimental machines in the blacksmith shop at Walnut Grove. This historic building can still be seen upon the old farm, preserved by his widow and children as the birthplace of the mechanical reaper. In these earlier years, however, the development of the reaper was not his chief occupation; in addition to farm duties, he devoted much time to the conduct of an iron-smelting furnace in the vicinity, which enterprise succumbed to the financial crash (1837) following the break of the United States Bank. In 1839 he seriously resumed consideration of the manufacture and development of the reaper; and, until his death in 1884, with marvellous assiduity and skill devoted his life to an industry that, under his management, became colossal.

The problem of manufacturing and marketing the McCormick machine was at once seen to be a path beset by great practical difficulties. After settling in full the accounts of the unfortunate iron industry, our inventor was left without capital. There were, of course, no railroads as yet penetrating the Valley of Virginia, and the nearest canal was many miles distant, over rough mountain roads, always difficult and sometimes impassable. All the material must be hauled overland—even the sickles were made forty miles away; the blades, six feet in length, being transported on horseback. In this manner the work was carried on in the old blacksmith shop at Walnut Grove—the first two machines being sold in 1840; two others in 1841, seven in 1842, twenty-nine in 1843, and fifty in each of the years 1844 and 1845. Until 1843, the sales had wholly been in Virginia; but in that year he sold a county right in Michigan, and the following season sent machines to New York, Tennessee, Ohio, Illinois, Wisconsin, Iowa, and Missouri.

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Early Field Trials

By 1844 the reaper was becoming widely known, and won general admiration because of its workmanlike success. A letter in the *Washington National Intelligencer*, dated at Lynchburg, Virginia, November 8 of that year, refers to a trial near Amherst Court House. "All were highly gratified, and many would linger and follow it around the field to admire and witness its neat, rapid, and perfect performance." The price of the machine at that time appears to have been \$100 if payable in the harvest, but \$106 if payment were deferred for four months; and its cutting capacity was warranted at "sixteen acres a day when properly attended." After the close of the Virginia harvest of 1844, the inventor personally conducted field trials and introduced his reaper in western New York, Ohio, Illinois, Wisconsin, and Missouri. This expedition opened his eyes to the fact that "while reapers were luxuries in Virginia, they were a necessity in Ohio, Illinois, and on the great plains of the West." The broad virgin prairies of the trans-Alleghany were seen to be the natural market of a mechanism which was revolutionizing agriculture by breaking down those rigid limitations upon the production of man's chiefest food, that had fettered the world since husbandry began. Scotch-Irish Indian-fighters from the Valley of Virginia, like the Clarks, the McAfees, and the Lewises, had by their prowess some seventy years previous opened transmontane lands to settlement; and now a young Scotch-Irish valley-man was, by the fruit of his inventive genius, accentuated by an equally keen business capacity, to invade this selfsame West with a device destined vastly to increase its wealth and power, and thus profoundly influence the course of American history.

Removal to Brockport

Mr. McCormick had seen that the West was not only his especial market, but that the factory must be nearer to that market. In a letter to one of his brothers, from La Porte, Iowa, he wrote: "It seems wrong to pay \$20 or \$25 freight, when they might be made in the West—considering too the greater uncertainty of shipping." In order to carry this thought into execution, he made two important moves in the late months of 1844. Per-

Cyrus Hall McCormick

sonally, he repaired to Brockport, New York, whence shipments might be made both eastward and westward through the Erie Canal. His younger brother, Leander J., was detailed to go to Cincinnati, and there superintend the construction of reapers by a manufacturing firm with which the inventor had made suitable arrangements. Thither was transported the product of the home plant from Walnut Grove, a laborious task for those primitive days. Finished machines were taken by wagon trains to the Virginia town of Scottsville, thence by canal to Richmond, then down James River to the sea, around Florida to New Orleans, and up the Mississippi and the Ohio to Cincinnati. At Brockport, for the harvest of 1845, Cyrus supervised in person the manufacture of two hundred machines, an output duplicated in 1846 and considerably increased in 1847. The Cincinnati branch does not appear to have turned out any product until the last-named year; and during the same season other machines were being constructed for the firm at Chicago, upon a royalty basis.

Established at Chicago

In the spring of 1847, Mr. McCormick himself moved to Chicago, which thus early he foresaw was to be the metropolis of the West, and thenceforth devoted himself entirely to the conduct of his business at that point. In 1851, he estimated that in eleven years he had sold a thousand machines. By 1860, the McCormick Reaper Works in Chicago were producing four thousand in a single year. The Chicago fire of 1871 destroyed not only all the buildings of the then thriving establishment, but the company's valuable patterns and the entire output of finished machines for the next year's harvest. With indomitable energy, however, the great inventor and equally great master of industry rebuilt on a far larger scale than before, his works having in 1875 a yearly output of twelve thousand reapers. The capacity of the McCormick Harvesting Machine Company, which was the largest concern of its kind in the world, prior to its absorption into the International Harvester Company (1902), was in 1901 fourteen hundred agricultural machines of various kinds for every working day of ten hours—sometimes the works are "rushed" on a twenty-four hour basis. At the busiest seasons seven thousand persons are employed at these works in the manu-

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facture of harvesters, mowers, rakers, tedders, and other implements of the sort.

It is not to be supposed that Mr. McCormick's business as a manufacturer grew to the present extent simply by its own impetus. For a long period of years his path was far from rose-strewn. He early met with discouragements and disheartenings before which a less resolute man would soon have quailed. In common with other labor-saving inventions of that period, his machines sometimes encountered mob violence, especially in New York and Ohio, and business rivalry was not always scrupulous as to methods. But his Scotch-Irish fighting blood was aroused by the opposition that he encountered in many forms, and with remarkably tenacious vigor he triumphed over it throughout nearly a half century of business activity.

Opposition to Extension of Patent

Under the law in vogue when the patent of 1834 was procured, an inventor was allowed a monopoly of his device for fourteen years; which term might be extended for another seven at the option of an extension board, consisting of the Commissioner of Patents, the Secretary of State, and the Solicitor of the Treasury. Having entered the market only in 1840, Mr. McCormick had but enjoyed a business of eight years' duration when in 1848 he applied for an extension. Up to that time, he had sold 778 machines, chiefly on a royalty basis, at a profit of \$20 each, aggregating \$15,560. In addition to this, territorial rights had been disposed of for \$7,083—thus making his entire receipts from the invention but \$22,643; from which, as shown by his sworn statement, were to be "deducted several thousand dollars" for travelling expenses and the employment of agents, not taking into account the value of his time.

The law provided that in considering extensions of patents, the board should "have due regard to the public interest therein:" thus leaving it open, that if an invention had come into extensive use and greatly interested the public, or if other manufacturers wished to escape paying royalty, opposition might be brought to bear through political and personal pressure. This is exactly what happened. One rival

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inventor at first bitterly contested even the matter of priority; but this was soon settled by the taking of abundant and unimpeachable testimony in Rockbridge and Augusta counties, Virginia, by which it was clearly proven that the McCormick reaper was used in the presence of reliable witnesses in the harvest of 1831, two years prior to the pretensions of any other successful inventor. Business rivals astutely developed opposition to extension on the part of the farmers. One hundred citizens of New York state sent a remonstrance asserting that McCormick had already made a great deal of money from his patent—it was the day when \$50,000 was thought to constitute a fortune; that if extended, this profit “would be \$30,000,000, and perhaps much more, as no limit can be set to the demand in the West;” and further naively declaring that, if the patent were thrown open, “the farming population would be largely benefited.”

A majority of the members of the board—James Buchanan, Secretary of State, and R. H. Gillet, Solicitor of the Treasury—were keen politicians and not unnaturally sensitive to the widespread demand from the farmers for unrestricted use of this much-needed invention. Their verdict was against extension, but without giving reason. The Commissioner of Patents, Edmund Burke, strongly favored granting the extension solely on the great merit of the invention.

Mr. McCormick thereupon appealed to Congress to grant a special act renewing the patent, and in that body the case became *un cause célèbre*, occupying the attention of the members for four years. Commissioner Burke wrote in strong terms to the senate committee on patents, March 4, 1850: “I do not hesitate to say that it [the McCormick invention] is one of very great merit. In agriculture, it is in my view as important, as a labor-saving device, as the spinning-jenny and power loom in manufacture. It is one of those great and valuable inventions which commence a new era in the progress of improvement, and whose beneficial influence is felt in all coming time; and, I do not hesitate to say, that the man whose genius produces a machine of so much value, should make a large fortune out of it. It is not possible for him to obtain during the whole existence of the term of his patent, a tenth part of the value of the labor saved to the community

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by it in a single year. Therefore I was in favor of its extension.”

Again and again the McCormick bill was reported favorably by committees, but an immense array of political, social, and commercial influence was brought to bear against it by a combination of patent attorneys, rival manufacturers, and agricultural interests; and in the end it was defeated. The last and probably the most successful appeal was made on behalf of the vested rights of those who had used and were using the patent since it had expired in 1848. Throughout this protracted and famous controversy, it is plainly to be seen in the debates that Congress had no thought or intention of detracting from or deciding against Mr. McCormick's position as an inventor; the priority of his claim appears to have generally been recognized, and encomiums upon the far-reaching effect of the invention are quite as freely found in the speeches in opposition to his request as in those favoring it.

Facing Competition

The basic principles of McCormick's first patent had thus, in 1848, been thrown open to the public, and were at once adopted by all other manufacturers. A host of commercial competitors sprang up, crowding the market with machines in which his ideas had been incorporated. Valuable improvements, which he had patented in 1845 and 1847, still gave his machine an advantage over their competitors. His was, however, not a nature to rest content with this mere relative superiority, which in the presence of other keen minds at work along the same lines might be but transitory. He was determined always to remain far in the advance, but in the accomplishment of this ambition found no easy task. Every change in the condition of the grain or the surface of the ground brought new problems to be solved; different remedies must be sought and tested, that should be in harmony with existing conditions. Experiments in the field were unceasing, so that his machine was the subject of constant invention.

In his voluminous correspondence, preserved by the family, are almost innumerable evidences of this unceasing activity throughout several decades. He attended field trials, sold

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county rights, and made royalty contracts in all parts of the West and South. His letters abound in suggestions to his brothers, who were ultimately taken into partnership. Each new trial seems to have given him food for thought, and these observations he at once communicated, often minutely, to other members of the family, who co-operated with him in seeing to it that the obstacles met in one harvest should be overcome in the next. These interesting human documents tell also of the successes that fired his heart; as when, writing in October, 1846, he exultantly states: "A man has just written from Wisconsin, that he can cut 235 acres with a reaper, and all O. K."

United with the determination and perseverance of an indefatigable inventor, were his masterly methods of business organization—an unusual combination, for inventors are seldom commercially successful. More and more widely extended became the operations of the McCormick Works, and the fame of its master soon spread around the world.

European Triumphs

His notable display at the World's Fair of 1851, in London, was Mr. McCormick's introduction to Europe. The reaper astonished the Old World, and alone saved the credit of the otherwise inferior American exhibit. At first the *London Times* was amused at this "cross between an Astley chariot, a wheel-barrow, and a flying machine;" but after a trial in the field, declared with enthusiasm that it was "worth the whole cost of the Exhibition." The council of juries reported: "The McCormick reaper is the most valuable article contributed to this exhibition, and for its originality and value and its work in the field it is awarded the council medal." Philip Pusey, M. P., one of the trial committee, an acknowledged expert, pronounced the McCormick reaper "the most important addition to farming machinery that has been invented since the threshing machine took the place of the flail."

This unprejudiced judgment by those who knew best, was accompanied by some attempts in the British press unduly to magnify certain prior English and Scotch inventions,

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particularly those of Bell and Ogle; but the claimants for these impractical machines failed to distinguish between them and an invention that had conquered the difficulties. The official board of the "Great Exhibition" rose superior to this insular prejudice, and handsomely recognized and honored the victorious American—a course historically justified by the fact that no reaper of British origin has survived.

Commenting upon this event, William H. Seward said: "The reaper of 1834, as improved in '45, achieved for its inventor a triumph which all then felt and acknowledged was not more a personal one than it was a National one. It was justly so regarded. No General or Consul drawn in a chariot through the streets of Rome by order of the Senate, ever conferred upon mankind benefits so great as he who thus vindicated the genius of our country at the World's Exposition of Art in the Metropolis of the British Empire."

This was the first of a series of European triumphs achieved by Mr. McCormick. In later years he was named by Emperor Louis Napoleon a chevalier of the Legion of Honor; the Emperor of Austria conferred on him a similar honor in 1873; he was elected a corresponding member of the French Academy of Sciences, "as having done more for the cause of agriculture than any other living man." At the Paris Exposition in 1855, the McCormick reaper received the gold medal of honor as "the type and pattern of all other reaping machines to the present day." Indeed, from all quarters of Christendom there came to him public recognition in the form of personal honors or professional awards; for in due time his machines were introduced into every civilized land, both at exhibitions and in the field, and in many cases directly under the supervision of the inventor himself.

Continued Opposition

We have spoken of the improvements patented by Mr. McCormick in 1845 and 1847. In 1860, the inventor applied for an extension of these patents. Again, however, he was met by well-organized opposition. Rival reaper manufacturers, operating through the agency of a firm of patent lawyers, industriously worked up antagonistic sentiment among the farmers, and thus brought a powerful influence to bear upon

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senators and representatives. Letters and petitions from farmers and manufacturers poured into Washington from all parts of the country; and the state legislatures of New York, Ohio, Indiana, Michigan, and Illinois adopted resolutions remonstrating against manufacturers and farmers being longer "compelled to pay tribute to Cyrus H. McCormick." Commissioner of Patents D. P. Holloway yielded to this great pressure, and refused the desired extension on grounds of public policy; but he nevertheless declared: "Cyrus McCormick is an inventor, whose fame, while he is yet living, has spread throughout the world. His genius has done honor to his own country, and has been the admiration of foreign nations, and he will live in the grateful recollection of mankind as long as the reaping machine is employed in gathering the harvest."

Perfecting the Harvester

This second rebuff did not in the least discourage Mr. McCormick. We find him still industriously attending field trials, improving his machine in a hundred ways, keeping it in the van of competition, and pushing the organization of his work. Throughout his life, he found no time to be idle. Automatic raking and binding had yet to be invented before the harvesting machine could be considered perfect. At the outset of the reaper, the grain was raked off the platform by a man walking beside it. Then came the raker's seat, in 1847. By 1860, there was added the labor-saving self-rake, first experimented with by McClintock Young in 1858. In 1881, what is known as the McCormick twine binder was introduced—based on the Gorham patent, but greatly improved and made workable by McCormick and his talented staff of mechanics. During the past ten years, the bound gavels are ejected into a "bundle carrier," in which they are transported until a sufficient number are collected to form a shock, where it is retained until dried or ready to be hauled to a place of storage. No intervention or impulse is required on the part of the driver, save the guiding of the horses; even the binder requires no substantial attention, and is dependent on the reaper for its power and its supply. In this manner has the simple reaper of 1831 developed into a perfect harvester.

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Stimulus to Agricultural Invention

We have seen that the area of the production of grain, which is man's chief food, depends in large measure upon the means available to garner the crop during the brief harvest period of ten days; and that so long as the sickle remained the principal instrument of the harvester, production was limited to about five acres for each human reaper. This area was materially increased by the introduction of the cradle. But Cyrus H. McCormick's invention of the mechanical reaper at once vastly extended the capabilities of the harvester—fifteen acres being then his daily capacity, with the aid of a team of horses; and with the minimum of labor, for driving a reaper is but play compared with the back-breaking toil of the sickle-wielder.

When once the chief limitation upon grain acreage was thus removed, there became noticeable a remarkable increase in agricultural patents of every character. The Commissioner of Patents reported in 1835: "Of late, inventors have directed their attention with peculiar interest to the improvement of implements of agriculture, and many labor saving machines have been patented which are of the highest utility to the husbandman. These are rapidly increasing and it is scarcely possible to conjecture to what extent the labor of the agriculturist may be diminished and the production of the country increased by these improvements. Already the processes of sowing, of mowing, and of reaping are successfully performed by horse power."

Extending the Area of Cultivation

In rugged New England, the land of small farms, husbandry is at best carried on by toilsome methods; modern inventions can do comparatively little to broaden the field of agricultural possibilities. In the Middle Atlantic States, with their wide stretches of level land, a quicker soil, and a more genial climate, grain growing is a fairly profitable industry. Yet even here, the problem of carrying on extended agricultural operations has been far less pressing than in the vast region of the trans-Alleghany. In the days when settlements

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were first being planted in the Middle West, the scarcity of farm labor and the difficulties of transportation greatly retarded growth. The opening of the Erie Canal, in 1825, and subsequent improvements in other canals, highways, and railroads, solved the transportation problem; but that of agricultural labor was still of prime importance.

The half billion fertile acres in the upper Mississippi valley, practically a fourth of the total land surface of the United States, are especially adapted to cereal culture. But although opened to cultivation largely during the first third of the nineteenth century—and freely offered to settlers by the federal government under a liberal land policy—the vast area of the Old Northwest could not at first be utilized to its fullest capacity so long as farm implements were crude and the supply of labor was limited. Fortunately, this remarkable extension of the area of cultivation was not long hampered by the slow development incident to primitive methods of agriculture; the reaper came in the nick of time.

The *Report* of the Commissioner of Patents for 1835 had somewhat overstated the case, as to the condition of rural mechanics in that year: patents had been taken out, but few of the inventions so glowingly referred to were as yet upon the market. Everything depended upon the reaper—for until the grain crop, restricted to a ten days' harvest, could be quickly and mechanically gathered, there was little need of improved methods of sowing and cultivating, for which processes there is nearly always ample season. The evolution of the successful reaper was not as rapid as had been anticipated; during six successive harvests it was being deliberately wrought out in practice, upon an isolated Virginia farm, so that 1840 may be considered the year of its practical introduction to a wide area. So soon, however, as this the greatest of all agricultural problems was solved to the satisfaction of the inventor, there was no further hesitation. Not only the reaper, but every manner of farm implement, naturally following in its wake, exhibited a phenomenal improvement. McCormick had shown the way; and under the stimulus of his success others rushed forward to complete the work with a great variety of machines, chiefly for the cultivation of crops and the threshing of grain.

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The effect upon American agriculture was immediate and profound. The *Patent Report* for 1844 indicated a widespread interest in the new implements, which were cordially welcomed, especially in the West, where their need had been most keenly felt—for the tide of New England and Middle West pioneers was now ready to invade the prairies, and their conquest was rendered possible only by labor-saving devices. In order profitably to use this ingenious machinery, many large farmers were leaving their timber lands and moving into the timberless levels, where roots, stumps, rocks, and steep hillsides did not interfere with mechanical mowers, reapers, and rakers. By 1846 the period of hand labor was plainly seen to be passing. Horse power was now fast becoming the dominant factor upon the farm.

Popularizing Machinery

The national and the state agricultural societies, state boards of agriculture, and farmers' institutes did their utmost to stimulate interest in rural machinery and to encourage its invention. Great trials of all manner of implements were held, especially during the ten years previous to the outbreak of the War of Secession—such trials as we have seen Cyrus H. McCormick attending, keenly watching the paths along which lay the success of his reaper. The greatest popular concern was, very naturally, in machinery for cultivating and harvesting grain: we read that during the nine years ending with 1860 no less than 2,233 patents were granted for inventions relating to cereal culture. Despite the expense of these modern devices—in 1852, the price of a McCormick reaper in Illinois and Wisconsin was \$130—farmers purchased freely; and from 1855 forward, the several varieties of reaping machine then in vogue were bought as rapidly as they could be turned out of the factories. Obviously, it was profitable to use them. In 1859, Reverdy Johnson declared that the McCormick reaper “had already contributed an annual income to the whole country of \$55,000,000 at least.”

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The Reaper's Services to the Union

It would lead us far beyond the necessary limits of this sketch, fully to emphasize the immense economic influence which the reaping machine exercised upon the conduct of the War of Secession by the Northern States. In June, 1861, Edwin M. Stanton delivered an address eulogizing Cyrus H. McCormick. He held that the great inventor's services to mankind and civilization were much beyond those of discoverers and conquerors, for his were the beneficent and everlasting victories of peace, and the world owed to their author an adequate reward. "The reaper is to the North," he said, "what slavery is to the South. By taking the places of regiments of young men in the Western harvest fields, it releases them to do battle for the Union at the front, and at the same time keeps up the supply of bread for the nation and the nation's armies. Thus without McCormick's invention I fear the North could not win, and the Union would be dismembered."

The *Report* of the Commissioner of Agriculture for 1862 asserts that owing to the absence of so many farm laborers at the front, it would have been quite impossible to harvest the wheat crop for that year, had it not been for the increased use of mechanical reapers, each of which effected a saving of the labor of five men.

Notwithstanding the enormous draught of recruits from our rural districts, to fight in the armies of the Union, agricultural operations could still not only be carried on by the North, and in numberless instances by mere youths, but the product itself was meanwhile substantially increased. Indeed, although the great struggle appreciably lessened invention in every other line of endeavor, the number of patents for improvements to grain harvesters was normally maintained.

An Era of Labor-Saving Invention

After the close of the war, there was once more a vast increase in the improvements to farming implements and machinery. We have already alluded to the continued development of the reaper, and the evolution of the modern harvester

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through the addition of the self-raker and the binder. In the United States Census *Report* for 1880, Professor William H. Brewer estimated that at that time five men could with horses and agricultural machinery accomplish the same results in the harvesting of grain as those obtainable by fifteen men in the decade preceding 1840; and probably their labor was nine or ten times as effective as it would have been during the decade ending in 1830. In the work, also, of preparing the ground, planting the crop, and cultivating it, a given amount of labor in 1880 was twice as effective as in the decade between 1820 and 1830.

In his summary of the "Statistics of Agriculture," in the Tenth Census *Report*, Dr. Francis A. Walker said: "To ask what has been done mechanically to promote our agriculture, is to challenge a recital of the better half of the history of American invention. Remarkable as have been the mechanical achievements of our people in the department of manufacturing industry, they have been exceeded in the production of agricultural implements and machinery."

Not only did the reaper prepare the way for other agricultural inventions, often wrought out by bright farmer boys who had everywhere been set to thinking how to improve the methods of their work; but mechanics were by this example stimulated to the discovery of better ways of doing all manner of things that had heretofore been done in a crude way. It was made plainer than ever before, that Americans are a remarkably inventive people; and the reaper was soon followed into the most distant markets of the world by a host of American contrivances calculated to lessen the burdens of men, and greatly to increase the productiveness and consequently the dignity of their labor.

Advancing the American Frontier

Upon the declaration of peace between the warring states, vast numbers of discharged Union soldiers went into the West, to take up homes under the military homestead law. Abundant land awaited settlement as late as 1880. The young man of the Central States found the prospect of acquiring a farm for himself more inviting than the return to the life of an agricul-

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tural renter or laborer. By the extensive use of agricultural machinery the centre of cereal production has been kept well in advance of the centre of our population. William H. Seward once claimed that the McCormick reaper had extended the American frontier at the rate of thirty miles each year—a sentiment practically identical with that uttered by Stanton, who in his previously-quoted address in 1861 showed upon a map how “McCormick’s invention in Virginia, thirty years before, had carried permanent civilization westward more than fifty miles a year.” As each new region in the Middle West—or, in time, the trans-Mississippi—was opened to settlement, aggressive men promptly invaded the new area, engaging in cereal culture upon a cumulative scale which within the past three decades has become vast. Thus, while the trend in this country has been largely toward the development of the cities at the expense of the rural districts, the yield of our crops has kept pace with the urban growth.

The Effect Upon the West

Socially, economically, and politically, the effect has been far-reaching and revolutionary. The vast levels of the Northwest have become the chief seat of our agricultural production, and the centre of political power in the United States. The new instruments of labor have everywhere reduced to a minimum the old-time drudgery of the farm; the storm and stress period of pioneer life has become a matter of history. By bringing to them this opportunity for larger prosperity and leisure, agricultural machinery doubtless saved the farmers of the West from sinking into a peasant class. With prosperity and leisure, came a taste for culture and the consequent development of academies, colleges, and universities. The farmer on his broad Western acres is in considerable measure independent of the exorbitant wages formerly demanded by men who worked only during the harvest season; he is industrious, intelligent, effective, has a wide outlook on life, and takes a high stand among his fellows. The humblest urban wage-earner had in turn had his benefit: the supply of food has been maintained, scarcity has been prevented, and prices are lessened; white wheat, now raised and harvested far more economically than before, can be obtained as cheaply as once were the coarser grains, and is now common to

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all. The introduction of improved agricultural machinery has made possible, also, the great flouring industries of the Old Northwest; and has promoted the prosperity of great railway systems that gridiron the prairies and plains, and of monster fleets of vessels that plough the Great Lakes, all engaged in transporting to market the products of the farm.

Nor are these advantages confined to America. Wherever, throughout the world, have gone the reaper and its lusty following of labor-saving inventions, life is easier than it was before, and rustic man is no longer slavishly bound to the grinding burden of the sickle and the hoe. His labor has been made vastly more productive, and this means better things in every walk of life.

Personality of McCormick

It is worth while inquiring what manner of man this was, who emancipated the farm laborer from his galling task, saved the Western farmer from degenerating into a drudge, and made possible a wonderful progress in agriculture throughout the world; of what stuff this Virginian was made, whose invention, taking the place of farm-hands drafted from the fields of the North, powerfully promoted the abolition of slavery in the South—thus counteracting the effects of the epoch-making cotton-gin of Eli Whitney, of Massachusetts, which had greatly extended the area of human bondage.

The most cursory view of his career shows him to have been gifted with force, a high degree of organizing capacity, and power of marvelous perseverance. It is seldom that a man is both the author and finisher of such a task as he set himself. The crude reaping machine that had been devised by his father did but set him thinking; it foreshadowed certain valuable principles, to which he first gave embodiment. With an insight given to but few men, he avoided the mistakes that had neutralized the work of his predecessors, and evolved the working mechanism which has held unto the present day.

With patient, infinite toil, he perfected this mechanism year by year. Opposition met him in every form—in the courts of law, in Congress, in the business world, and in mechanical difficulties encountered upon the harvest field. But he recognized no enduring obstacles. He was not easily discouraged, although

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defeats hurt him; he was content with nothing less than conquering—and he did not always conquer. He stands today as a typical hero of the vast economic movements by which America has profoundly influenced mankind at large—the representative of agricultural invention for increasing and cheapening the food crop of the world.

With all his bull-dogged tenacity, which he had inherited from a long line of Scotch-Irish fighting stock, this great inventor and powerful master of industry, this type of a great historic movement, presented to his many friends a tender and magnetic side. He disliked ostentatious display, he was simple in his personal tastes, he dearly loved his wife and family, he was deeply religious, his philanthropy was ever active, and few will know the extent and variety of his charities. Upon the thirteenth of May, 1884, he passed from this life at his home in Chicago, sincerely mourned by those who had learned to love as well as to honor one of the world's greatest benefactors.



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